

What is claimed is:

1. A method to heat-treat a substrate, comprising the steps of:

(a) controlling a gas concentration of an atmosphere in which heat treatment is carried out; and

(b) heat-treating the substrate in the atmosphere of which the gas concentration is controlled.

2. A method to heat-treat a substrate coated with a coating solution which oxidizes at high temperatures, said method comprising the steps of:

(a) lowering an oxygen concentration of a treatment atmosphere when the temperature is low;

(b) heat-treating the substrate in the treatment atmosphere of which the oxygen concentration is lowered; and

(c) returning the treatment atmosphere to that with the original oxygen concentration after completing said heat treatment.

3. The method as set forth in claim 2,

wherein said step (c) returns the treatment atmosphere to that with the original oxygen concentration after the passage of a predetermined time from the completion of said heat treatment.

4. The method as set forth in claim 2,

wherein the coating solution is an organic coating solution.

5. The method as set forth in claim 2,

wherein said step (a) replaces the treatment atmosphere with inert gas when the temperature is low.

6. The method as set forth in claim 2,

wherein said step (c) exposes the substrate to the air after the passage of a predetermined time from the completion of said heat treatment.

7. The method as set forth in claim 2,

wherein said step (c) returns the treatment atmosphere to that with the original oxygen concentration when the temperature of the substrate becomes lower than a predetermined value.

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8. ~~The method as set forth in claim 2,
wherein said step (c) exposes the substrate to the air when
the temperature of the substrate becomes lower than a predetermined
value.~~

9. A heat treatment apparatus, comprising:
a treatment chamber;
a holding member provided in said treatment chamber for holding a substrate coated with an organic coating solution;
a means for replacing an atmosphere in said treatment chamber with inert gas;
a means for heat-treating the substrate held by said holding member in the atmosphere which is replaced with the inert gas by said replacing means; and
a means for exposing the inside of said treatment chamber to the air after the passage of a predetermined time from the completion of the heat treatment.

10. The apparatus as set forth in claim 9, further comprising:
support pins appearing and disappearing from / into a surface of said holding and heating member for supporting the substrate apart from the surface of said holding and heating member when appearing and for mounting the substrate on the surface of said holding and heating member when disappearing, and
wherein said treatment chamber has a lid body which opens and closes;
wherein said replacing means replaces the atmosphere in said treatment chamber with inert gas in a state that the substrate is supported by said support pins;
wherein said heat-treating means heat-treats the substrate, which is mounted on the surface of said holding and heating member as a result of said support pins disappearing, in the atmosphere which is replaced with the inert gas by said replacing means; and

wherein said means for exposing separates the substrate from the surface of said holding and heating member by projecting said support pins after completing the heat treatment and opens the lid body to expose the inside of said treatment chamber to the air after the passage of a predetermined time.

11. The apparatus as set forth in claim 9, wherein said replacing means includes a means for blowing inert gas into said treatment chamber.
12. The apparatus as set forth in claim 11, further comprising: a means for controlling the blowout of the inert gas by the blowing means corresponding to the passage of treatment time.
13. A heat treatment apparatus, comprising:
 - a treatment chamber;
 - a holding member provided in said treatment chamber for holding a substrate coated with an organic coating solution;
 - a means for replacing an atmosphere in said treatment chamber with inert gas;
 - a means for heat-treating the substrate held by said holding member in the atmosphere which is replaced with the inert gas by said replacing means;
 - a means for measuring the temperature of the substrate to be heat-treated; and
 - a means for exposing the inside of said treatment chamber to the air when the temperature of the substrate becomes lower than a predetermined value after completing the heat treatment.
14. A treatment system, comprising:
 - a treatment chamber;
 - a holding member provided in said treatment chamber for holding a substrate coated with an organic coating solution;
 - a means for replacing an atmosphere in said treatment chamber with inert gas;
 - a means for heat-treating the substrate held by said holding member in the atmosphere which is replaced with the inert gas by

said replacing means;

a means for exposing the inside of said treatment chamber to the air after the passage of a predetermined time from the completion of the heat treatment; and

a carrying apparatus disposed in said treatment chamber for carrying the substrate in / out, and

wherein said carrying apparatus includes a holding and cooling plate for holding and cooling the substrate, and adjusting and supporting pins disposed adjustably in height on the holding and cooling plate for supporting the substrate to be apart from the holding and cooling plate.

15. A treatment system, comprising:

a treatment chamber;

a heat treatment section provided in said treatment chamber for heat-treating a substrate;

a carrying apparatus provided in said treatment chamber for carrying the substrate into / out of said heat treatment section; and

a means for replacing an atmosphere in said treatment chamber with cooled inert gas.

16. The treatment system as set forth in claim 15,

wherein said replacing means replaces the atmosphere in said treatment chamber with the cooled inert gas when said carrying apparatus carries the substrate out of said heat treatment section.

17. A treatment system, comprising:

a casing;

a heating and mounting table provided in said casing for heating the mounted substrate to a predetermined temperature;

a hoisting and lowering member provided at a heating and mounting table and vertically moving with holding the substrate; and

a cooling and mounting table provided in said casing for receiving the substrate which is supported by said hoisting and lowering member and for cooling the received substrate to a

predetermined temperature.

18. The treatment system as set forth in claim 17,
wherein said casing includes a substrate carrying-in
aperture for carrying the substrate in and a substrate carrying-out
aperture for carrying the substrate out;

wherein said heating and mounting table mounts thereon the
substrate which is carried in from the substrate carrying-in
aperture; and

wherein said cooling and mounting table moves to a position
where the substrate is carried out from the substrate carrying-out
aperture.

19. The treatment system as set forth in claim 17,
wherein said casing includes a substrate carrying-in/out
aperture for carrying the substrate in / out;

wherein said heating and mounting table mounts thereon the
substrate which is carried in from the substrate carrying-in/out
aperture; and

wherein said cooling and mounting table moves to a position
where the substrate is carried out from the substrate
carrying-in/out aperture.

20. The treatment system as set forth in claim 17,
wherein said cooling and mounting table includes a notch
section which is free from touching said hoisting and lowering
member.

21. The treatment system as set forth in claim 17, further
comprising:

a cover for covering said heating and mounting table in said
casing.

22. The treatment system as set forth in claim 17, further
comprising:

a member disposed between said heating and mounting table
and said cooling and mounting table for insulating a thermal

atmosphere.

23. The treatment system as set forth in claim 17,
wherein said cooling and mounting table includes therein
a channel in which a temperature-controlled fluid flows.

24. The treatment system as set forth in claim 17,
wherein said cooling and mounting table is provided with
Peltier elements.

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